PATENT ABSTRACTS OF JAPAN

(11)Publication number : 09-027468
(43)Date of publication of application : 28.01.1997

(51)Int.Cl. H01L 21/304
H01L 21/306
H01L 21/3065

(21)Application number : 07-173177
(22)Date of filing : 10.07.1995

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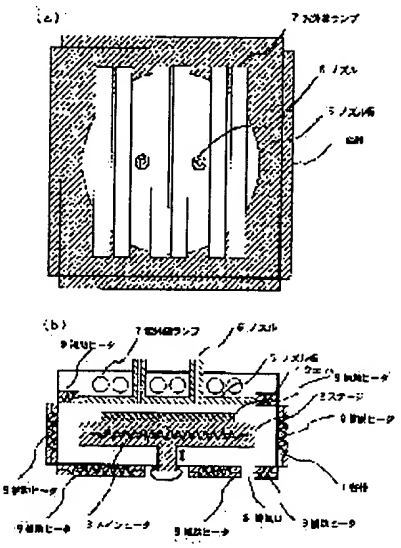
(54) WAFER SURFACE TREATING METHOD AND APPARATUS

(57)Abstract:
PROBLEM TO BE SOLVED: To reduce the power up of an internal heater and power load on a slip ring and enable the temp. uniformity of a large size wafer by using at least one auxiliary heater in addition to the internal heater contained in a stage on which a wafer is laid.
SOLUTION: Main heater 3 for heating a wafer 4 is contained in a stage 2 on which the wafer 4 in a easing 1 is laid. Auxiliary heater 9 is mounted on the side wall, top plate or bottom plate of the casing 1. In an upper part of the casing 1 nozzles 6 are disposed to feed ozone into a lower part of the casing 1 and the nozzles 6 face the surface of the wafer 4. Nozzle plate 5 also serving as a partition is disposed at the lower side of the nozzles 6. In an upper part of the casing 1 a plurality of ultraviolet lamps 7 are disposed as desired for irradiating the wafer 4 with an ultraviolet ray. The nozzle plate 5 is made of a material such as synthetic quartz easy to pass the ultraviolet ray.

UV

quartz, container



LEGAL STATUS

[Date of request for examination]

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[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention relates to the method of heating a wafer and processing the front face, and its equipment.
[0002]
[Description of the Prior Art] Conventionally, the organic substance stripper using ozone gas was heating the wafer using the heater built in the stage, as shown in drawing 2 . Therefore, power-up of this built-in heater is needed with diameter[of macrostomia]-izing of a wafer. For example, when the diameter of a wafer becomes 8 inches from 6 inches, also together with increase of the thickness of a wafer, the still bigger heater also from the field which the weight becomes about 2.4 times, and secures the homogeneity of temperature is needed. However, the formation of large power of the slip ring (mechanism which carries out an electric power supply to the axis of rotation) which supplies power to the built-in heater of a stage to compensate for diameter[of macrostomia]-izing of a wafer was very difficult.
[0003]
[Problem(s) to be Solved by the Invention] The purpose of this invention is to offer mitigating power-up of the built-in heater accompanying diameter[of macrostomia]-izing of a wafer and mitigating the power burden to the slip ring which is the movable portion of equipment, and improving reliability, and the outstanding equipment of temperature homogeneity, and offer the removal method and equipment of the organic substance with little dispersion with the whole wafer also with the diameter wafer of macrostomia, further.
[0004]
[Means for Solving the Problem] With the wafer heating method of this invention, and its equipment, the auxiliary heating mechanism of a piece other than the heating mechanism built in the stage in which a wafer is laid is used at least.
[0005]
[Function] By using an auxiliary heating mechanism, it is mitigated and the burden of reliability of the slip ring of a built-in heater improves. If it is made this appearance, a wafer can be heated not only from a main heater but from a space heater, and the programming rate of a wafer can be made quick. Moreover, since the temperature gradient near the wafer becomes small and the homogeneity of wafer temperature improves, the removal speed of the organic substance with little dispersion is obtained with the whole wafer.
[0006]
[Example]
(Example 1) Explanatory drawing of the wafer surface treatment equipment of this invention is shown in drawing 1 . The main heater which heats a wafer with this equipment is built in the stage 2 (rotation and vertical movement can be carried out) in which the wafer in a container 1 is laid. A space heater is formed in the side attachment wall of a container 1, a top plate, and a bottom plate. The nozzle [for the upper part in a container 1 supplying ozone to the lower part in a container 1] 6 and nozzle 6 bottom faces the front face of a wafer 4. Moreover, the nozzle plate 5 which served as partition is formed in the nozzle 6 bottom. The opening of the bottom side of a nozzle plate 5 and the upper surface of a wafer 4 is adjusted by the value of a 0.2-1.0mm request with the vertical drive (not shown) of a stage 2. Moreover, two or more ultraviolet ray lamps 7 to which the upper part in a container 1 irradiates ultraviolet rays at a wafer 4 if needed are arranged. Therefore, the nozzle plate 5 consists of material, such as synthetic quartz which is easy to penetrate ultraviolet rays.
[0007] Surface treatment for clarification of the wafer 4 by the above-mentioned equipment is performed as follows. First, a stage 2 falls according to the vertical mechanism (not shown) of a stage 2, and a wafer 4 is laid on a stage 2 by the conveyance arm (not shown). Next, it is adjusted by the value of the request whose gap of a wafer 4 and a nozzle plate 5 is 0.2-1.0mm with the vertical drive (not shown) of a stage 2, while supplying ozone from a nozzle 6, a stage 2 is rotated, and it processes. The organic substance with an unnecessary wafer front face reacts with ozone, serves as carbon dioxide gas and a steam, and exhausts this from an exhaust port 8. The reaction of ozone and the organic substance is promoted by irradiating ultraviolet rays by the ultraviolet ray lamp 7 at a wafer if needed.
[0008] When a side attachment wall, a top plate, and a bottom plate are kept at 150-200 degrees C with a space heater in the case of 300-degree C setting temperature of a wafer, the homogeneity of wafer temperature was compared without the space heater, and has improved 30 to 50%. Moreover, the homogeneity within a wafer side of the removal speed of the organic

substance has also been improved 20 to 30%.

[0009] (Example 2) The 2nd example of this invention is shown in drawing 3 . The case where an infrared lamp was used for an auxiliary heating mechanism was shown in this drawing. Also in this case, there was the same effect as the case of an example 1.

[0010] (Example 3) The 3rd example of this invention is shown in drawing 4 . The ceramic heater formed with screen printing was used for the quartz nozzle plate in this drawing. Also in this case, there was the same effect as the case of an example 1.

[0011]

[Effect of the Invention] According to this invention, by using a space heater, it was mitigated and the burden of reliability of the slip ring which supplies power to a built-in heater of the heater built in a stage improved. Moreover, when it was made this appearance, the wafer could be heated not only from a main heater but from the space heater, and the programming rate of a wafer was able to be made quick. Moreover, the temperature gradient near the wafer became small and the homogeneity of wafer temperature improved. Furthermore, the removal speed of the organic substance with little dispersion was obtained with the whole wafer. Moreover, adhesion in these fields of the non-decomposed component of a resist was also able to be lessened by heating a side attachment wall, a top plate, and a bottom plate.

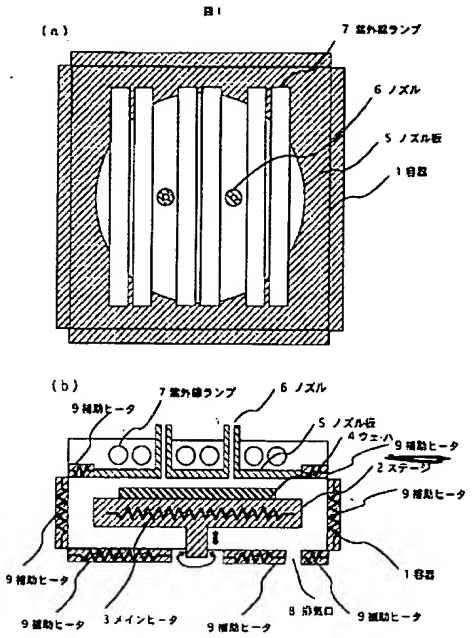
[Translation done.]

CLAIMS

[Claim(s)]
[Claim 1] The art on the front face of a wafer characterized by using at least the auxiliary heating mechanism of a piece other than the heating mechanism built in the stage in which a wafer is laid in the method of heating a wafer and processing the front face.
[Claim 2] The art on the front face of a wafer using [on a claim 1 and] ozone gas.
[Claim 3] The art on the front face of a wafer using [on a claim 1 and] ultraviolet rays and ozone gas.
[Claim 4] The art on the front face of a wafer which uses an infrared lamp for the aforementioned auxiliary heating mechanism of a claim 1.
[Claim 5] The art on the front face of a wafer which uses a ceramic heater for the heating mechanism or auxiliary heating mechanism built in the aforementioned stage of a claim 1.
[Claim 6] The processor on the front face of a wafer characterized by having at least the auxiliary heating mechanism of a piece other than the heating mechanism built in the stage in which a wafer is laid in the equipment method of heating a wafer and processing the front face.
[Claim 7] The processor on the front face of a wafer using [on a claim 1 and] ozone gas.
[Claim 8] The processor on the front face of a wafer using [on a claim 1 and] ultraviolet rays and ozone gas.
[Claim 9] The art on the front face of a wafer which uses an infrared lamp for the aforementioned auxiliary heating mechanism of a claim 1.
[Claim 10] The processor on the front face of a wafer which uses a ceramic heater for the aforementioned heating mechanism or the aforementioned auxiliary heating mechanism built in the aforementioned stage of a claim 1.

[Translation done.]

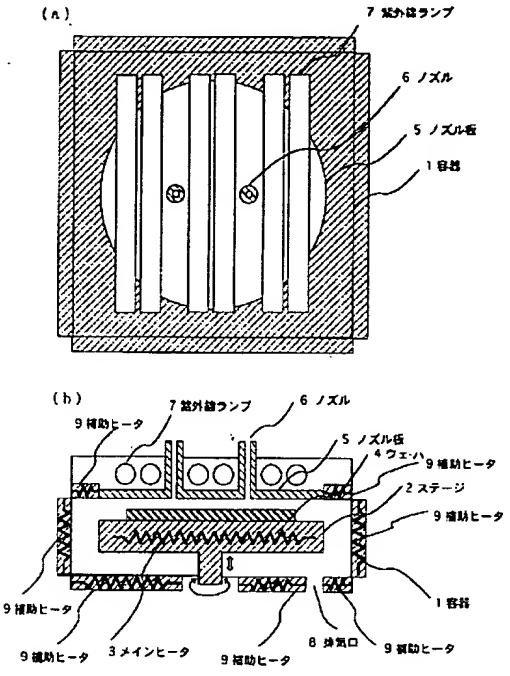
Drawing selection [Representative drawing]



[Translation done.]

Drawing selection drawing 1

図1

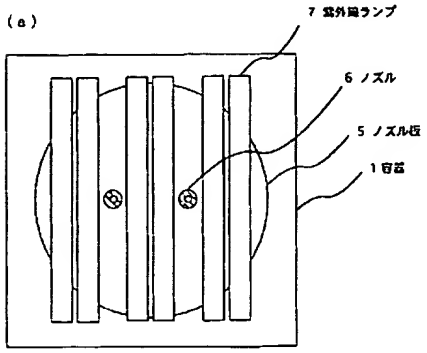


[Translation done.]

Drawing selection drawing 2

図2

(a)



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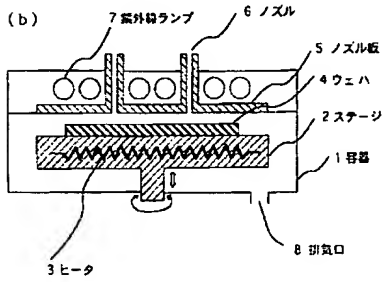
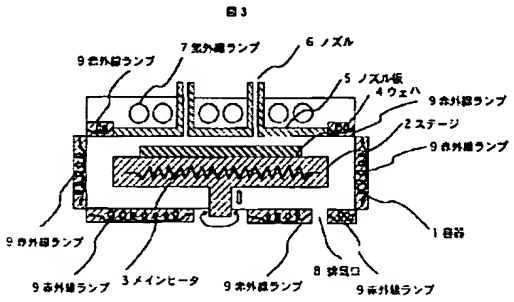


[Translation done.]

Drawing selection drawing 3

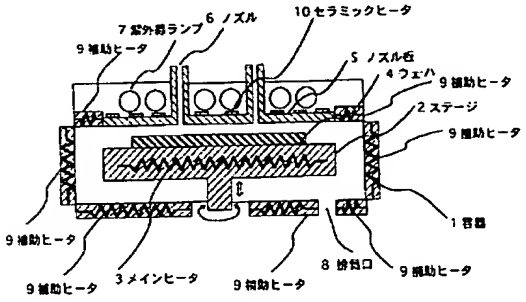
図3



[Translation done.]

Drawing selection drawing 4

図4



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